

10/501577

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
24 July 2003 (24.07.2003)

PCT

(10) International Publication Number  
**WO 2003/060227 A3**

(51) International Patent Classification<sup>7</sup>: **D06M 13/432**,  
16/00, G01N 30/00, 33/36, C12N 9/42, 9/76

(21) International Application Number:  
PCT/US2003/000753

(22) International Filing Date: 10 January 2003 (10.01.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/340,937 10 January 2002 (10.01.2002) US

(71) Applicant (for all designated States except US): **GLY-COZYME, INC** [US/US]; 17935 Sky Park Circle, Suite E, Irvine, CA 92614-6321 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **MURRAY, Allen, K.** [US/US]; 2330 Lerwick Place, Newport Beach, CA 92660 (US).

(74) Agents: **KIRCHANSKI, Stefan, J.** et al.; Crosby, Heafey, Roach & May, 1901 Avenue of the Stars, Suite 700, Los Angeles, CA 90067 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

(88) Date of publication of the international search report:  
17 June 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: ENZYMATIC DEGRADATION OF COTTON FIBRES: EFFECT OF PROTEIN CROSS-LINKING AND THE USE OF DEGRADATION TO CHARACTERIZE FIBERS OF PLANTS OF DIFFERENT GENETIC BACKGROUNDS

(57) Abstract: Specific extraction of the oligomers from cotton fibers can be achieved by a 24-hr incubation at 37°C with trypsin, chymotrypsin, proteinase K or pepsin, followed by a second 24-hr incubation at 37°C with cellulase (*Trichoderma reesei*) or β-glucosidase. Alternatively, samples were first subjected to cellulase or β-glucosidase treatment followed by the protease. The residual material is then treated with 0.5N HCl at 100°C and the extracts analyzed. Fibers treated with cellulase: followed by protease disintegrated and appeared as a cloudy solution, while the fibers treated with protease followed by cellulase retained their structural identity. This analysis reveals striking differences between cotton fibers from different varieties with respect to their susceptibility to enzymatic degradation. This protocol can be used to identify biochemical characteristics, which can then be correlated with genetic markers for advances in plant breeding.

WO 2003/060227 A3

# INTERNATIONAL SEARCH REPORT

Rec'd PCT/PTO 12 JUL 2004

Int'l Application No

PCT/US 03/00753

10/501577

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 D06M13/432 D06M16/00 G01N30/00 G01N33/36 C12N9/42  
C12N9/76

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 D06M G01N D21C C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99/35491 A (MURRAY ALLEN K) 15 July 1999 (1999-07-15) claims 4-6	1-3
X	GB 772 343 A (BAYER AG) 10 April 1957 (1957-04-10) page 1, line 1 - page 2, line 6; claims	1,2

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

21 August 2003

Date of mailing of the international search report

09. 02. 2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Koegler-Hoffmann, S

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 03/00753

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-3

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

International Application No. PCT/US 03 00753

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-3

A method of improving fabric properties comprising treating cotton fibers with a chemical reagent which forms covalent bonds with amino groups present within the fibers  
---

2. claims: 4-13

A method of enzymatically degrading cotton fibers to yield essentially pure cellulose comprising the steps of sequentially treating the fibers first with cellulase and then with protease .

A method of characterizing cotton fiber cell walls comprising the steps of specific enzyme degradation in sequential steps utilizing cellulase and protease.  
---

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No  
PCT/US 03/00753

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9935491	A	15-07-1999	US 6051435 A	18-04-2000
			AT 228653 T	15-12-2002
			AU 2312599 A	26-07-1999
			DE 69904157 D1	09-01-2003
			DE 69904157 T2	24-07-2003
			EP 1068523 A2	17-01-2001
			ES 2189385 T3	01-07-2003
			JP 2002501172 T	15-01-2002
			WO 9935491 A2	15-07-1999
			US 6562626 B1	13-05-2003
GB 772343	A	10-04-1957	DE 1011869 B	11-07-1957
			BE 541048 A	
			FR 1130846 A	12-02-1957